

DATECS

USER'S MANUAL

**ESC/POS
Thermal Printer
EP-2000**



We wish you a pleasant work
with EP-2000!

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INTRODUCTION

DATECS EP-2000

/// Main Features ///

DATECS EP-2000 is a ESC/POS thermal printer with 3-inch wide printing mechanism. It is designed for use with a broad array of terminal equipment, including data, POS and kitchen terminals. With extensive features, it can be used in a wide range of applications. Printer can quickly and easily print text and/or graphics, depending on customer's needs – barcodes, logo, etc.

Features:

- Compact, easy-to-use universal design;
- High speed (220 mm/s) printing;
- Low noise;
- Easy paper-loading;
- Can be used with 2 types of thermal paper – 78 mm or 58 mm wide;
- Serial RS232 and USB interfaces;
- Built -in cash drawer and external display interfaces;
- Auto cutter mechanism;
- Paper near-end sensors;
- Supports protocol for POS and BARCODE;
- Capable of printing alpha-numeric and graphical data;
- ERROR indication is available with LED or buzzer;

Parameter	Description	
Printing	Printing Method	Line thermal dot printing method
	Resolution	203 dpi (8 x 8 точки/mm)
	Dot pitch	Horizontal – 0.125 mm (8 dot/mm) Vertical – 0.125 mm (8 dot/mm)
	Max. Print Width	72 mm / 576 dots per line
	Number of characters per line	48 – for fonts A and C 64 – for fonts B and D
	Paper Feed System	Step
	Printing Speed (Max)	220 mm/s (1760 dots/s)
Шрифтовe	Resident Fonts	Font A: 12 x 24 dots (48 char./ line); Font B: 9 x 16 dots (64 char./line);
	Loadable	Font C: 12 x 24 dots (48 char./line); Font D: 9 x 16 dots (64 char./line);
Media: Roll Thermal Paper	Paper width, mm	80 or 58
	Diameter, mm	up to 102
	Paper thickness, µm	65–85
Resident Barcodes	1D	EAN 13 EAN 8 UPC A UPC E Codabar Code 39 Code 128
	2D	PDF417, QR code
Logo Registration	1 Black & White	Size: 576 x 248 dots
Interfaces	Serial	RS232 C – max. 115200 bps
	USB	USB v 1.1, compatible with 2.0
	LAN	100 Mbps (100 BASE-TX)

Parameter		Description
Emulation	ESC/POS	Continuous paper Mode
Input Buffer		131 072 bytes
Power consumption		~48 W (in normal printing)
Built-in AC adapter	Model: Input: Output:	Citizen 35AD1 AC 100 – 240 V, 1,3 A, 50/60 Hz DC 24 V, 1,9 A
Operation switches	FEED button Switch ON/OFF	Paper feed, Self test, Dump Mode Switch On/Switch OFF
Power Switch		ON/OFF
Weight	Without paper:	~2 kg
Dimensions (mm)		147 (W) X 207 (D) X 147 (H)
Environment	Operating temperature conditions:	Temperature from 0°C to 40°C Humidity from 35% RH to 85% RH
	Storage temperature conditions:	Temperature from -20°C to 60°C Humidity from 10% RH to 90% RH
Reliability	Printing Head:	150 km paper long
	Auto cutter life:	2 million cuts
	(at normal temperature/humidity/with recommended paper used)	
Cables		Power cable RS-232 interface cable

SAFETY INSTRUCTIONS

which must be strictly observed!



Warning

Indicates a situation, which if was not observed and handled properly, could result in serious injury.



Warning

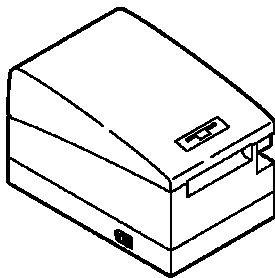
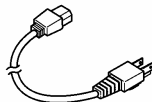



- Do not use or store the printer in places where it will be exposed to: direct sunlight; chemical reactions in laboratory; airborne oil, steel particles or dust.
- Do not place any objects on the printer.
Be careful when moving or carrying the printer. Dropping the printer may cause injury or property damage. The printer must be operated horizontally only.
- Do not drop or put foreign matter such as clips and pins into the printer.
This may cause problems.
- Do not spill drinks such as tea, coffee and juice on the printer or spray insecticide on the printer. If drink or water is spilled, first be sure to turn the power off and then consult our service personnel.
- When cleaning the surface of the printer case, do not use the cloth that is soaked in thinner, trichloroethylene, benzene, ketone or similar chemicals.
- Operate the control panel properly. A careless, rough handling may cause problems or malfunction. Do not use such sharp-edged tool as a ballpoint pen for operation.
- When printer trouble occurs, do not try to disassemble it. Instead, consult our service personnel.
- Do not disassemble or modify the printer.
- Clean regularly print head paper dust and other impurities using a soft cloth soaked in ethyl alcohol.



DATECS NOTICE

- Before use, be sure to read this manual. And keep it handy for reference when needed.
- **DATECS** reserves the right to change the content of this manual without prior notice.
- Reproduction, transfer, or transmission of the contents of this manual without prior consent is strictly prohibited.
- **DATECS** is not liable for any problems resulting from the use of optional products and consumable supplies other than the designated products contained herein.
- Do not handle, disassemble or repair the parts other than those specified in this manual.
- **DATECS** is not liable for any damage caused by user's erroneous use of the printer and inadequate environment.
- Data residing in the printer is temporary. Therefore, all data will be lost if power is lost. **DATECS** is not liable for any damage or loss of profits caused by data loss due to failures, repairs, inspections, etc.
- Please contact us if there are any mistakes or ambiguities within this manual. We would be grateful!

When unpacking the printer, check carefully that the following accessories are included in the carton:

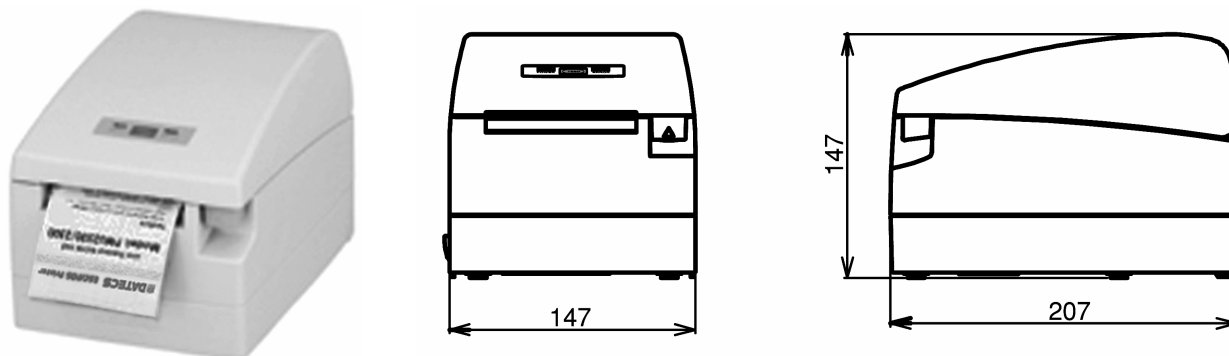
Item	Part Name
1	EP-2000 Thermal printer 
2	AC power cord 
3	RS232 Interface cable
4	1 Test Roll of thermal paper 
5	User's Manual 
6	EP-2000 Drivers 
7	Partition for 58/60 mm paper rolls



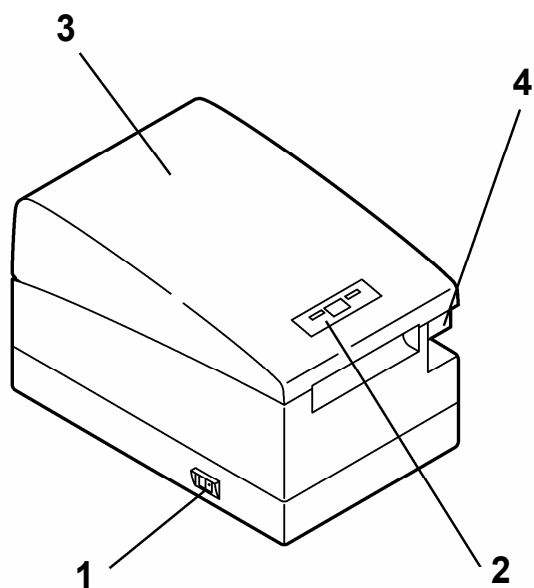
Because of the continually evolving Drivers & SDK to support new mobile devices, Drivers & SDK are distributed online and is available for download at our website indicated below:

<http://datecs.bg/support.php?cat=4&soft=1#1>

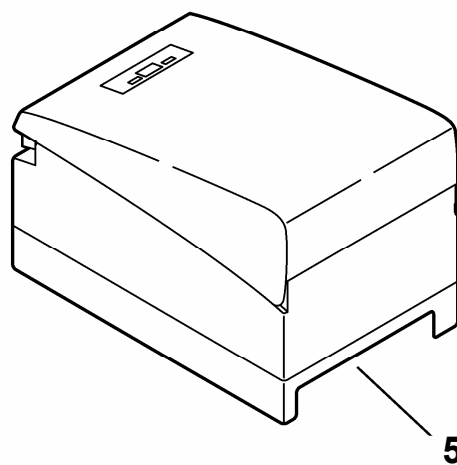
External view and dimensions



Front view / rear view



Front view

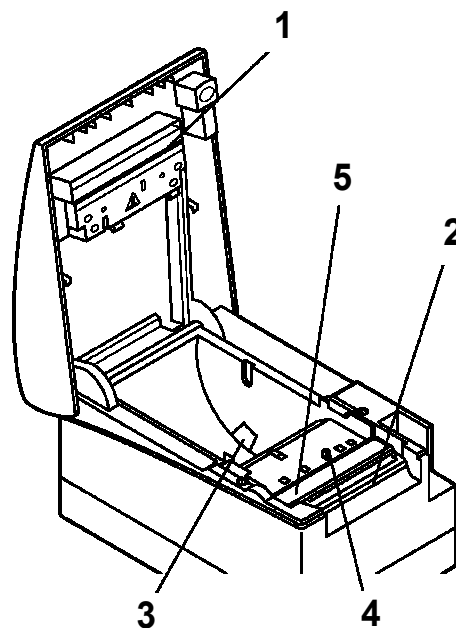


Rear view

- ① **ON/OFF** power switch
- ② Operation panel
- ③ Printer cover
- ④ Cover open button
- ⑤ Connectors

Printer inside

- ① Printing (thermal head)
- ② Auto cutter
- ③ Paper near-end sensor
- ④ Paper end sensor
- ⑤ Paper feed roller



Connectors



- 1. LAN
- 2. RS232
- 3. Display
- 4. USB
- 5. Drawer

Operation panel

① **POWER** Led

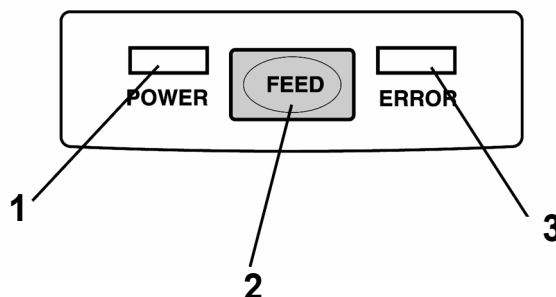
It flashes in **green** when the printer power is **on**, not lit – when the printer power is **off**. May blink in special modes or in case of error (see LEDS section).

② **FEED** button

Mainly it is used for feeding the paper. There are another functions, set by firmware, described in section **ON/OFF** switch and **FEED** button functions.

③ **ERROR** LED

Indicates paper end or other cases of error – flashes or blinks. The interval length of blinking represents the type of error.



ON/OFF switch and FEED button functions

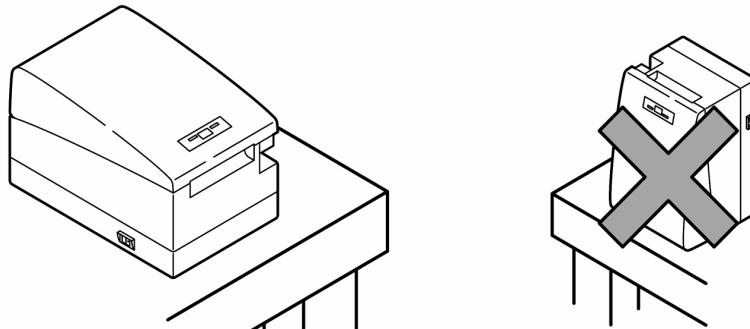
	Functions		
ON/OFF	1. Switch ON / Switch OFF the printer.		
FEED	1. Pressing LF button – feeding the media while the button is pressed, after releasing the button the feeding stops.		
	2. Push and Hold while Power ON – Release after the number of beeps:	After ~ 0.5 sec and after the 1-beep	SHORT SELF TEST print
		After ~ 2.5 sec and after the 2-beep	Hex DUMP mode
		After ~ 4.5 sec and after the 3-beep	LONG SELF TEST print
		After ~ 6.5 sec and after the 4-beep	Entering hardware setup mode (hardware menu).
		After ~ 8.5 sec and after the 5-beep 4-tone beep	Program mode – loading the firmware
	3 Pressing FEED button in hardware setup mode confirms the changes (YES).		

LEDS

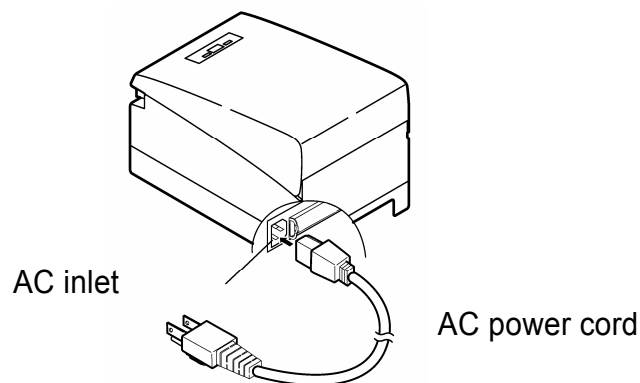
LEDS	Function
POWER, ERROR	<p>1. POWER flashes in green – the printer power is on</p> <p>2. POWER, ERROR are not lit – the printer power is off.</p> <p>3. Changing POWER – Green, ERROR – red – the printer thermal head is overheat. The printer stops printing. When the printer head temperature returns to normal the POWER flashes green and the printer continues to print.</p> <p>4. When switching ON the printer, while the FEED button is pressed, POWER – Green, ERROR – red flashes are rotated after every beep (up to the fifth). Depending on how long the FEED button is pressed the printer behavior is as described above in the section ON/OFF switch and FEED button functions.</p> <p>5. ERROR LED is permanently lit red – end of the paper or paper out; After the loading a new paper roll and pressing FEED button, the POWER LED flashes green and the printer is ready to print.</p>

Installing the printer

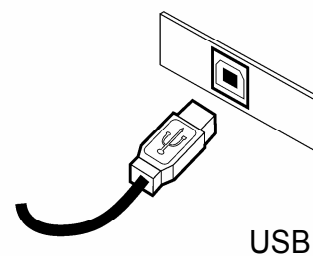
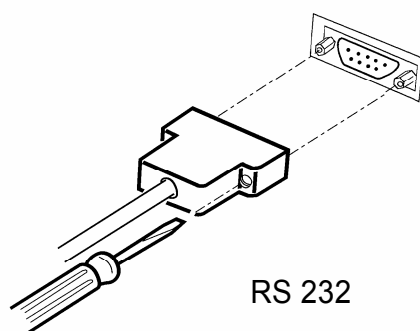
The printer must be operated horizontally only. Do not operate vertically or install on a wall..



Connecting the AC power cord



Interfaces



LAN – 100 Mbps (100 BASE-TX)

Printer Configuration

EP-2000 uses nonvolatile memory for storing some of the printer default configuration. The following table shows the available options:

Memory Switch (see GS command)	1000000111000
BAUD RATE	115200 bps
PRINT DENSITY	100%
CHARACTER TABLE	WESTERN (1252)

To change the settings:

1. Switch OFF the printer.
2. Switch **ON** the printer pressing **FEED** button.
POWER – green, ERROR – red, are rotated after every beep.
3. After the **4-th beep** (after about **6 сек.**) and 2 short beeps, accompanied by 2 LED blinking – **POWER – green, ERROR – red**.
After releasing the **FEED** button in this printer state, the printer enters the hardware setup mode (hardware menu) and prints the current settings.
4. Follow the printer instruction to make the necessary changes.

Long pressing the **FEED** button (**YES**) – confirms changes.

Short pressing the **FEED** button (**No Changes**) – cancels changes.



To exit the hardware menu **switch off** the printer.



Care must be taken when changing factory preset configuration information.

Memory Switches Setup

EP-2000 has 13 memory switches, which have the following action:

Flag	OFF	ON
1	Power ON/OFF sound disabled	Power ON/OFF sound enabled
2	CR (ASCII code 13) is not executed	CR is executed LF (ASCII code 10)
3	LF (ASCII code 10) is executed	LF (ASCII code 10) is not executed
4	LF immediately after CR as selected by flag 3	LF immediately after CR is not executed
5	Default is Font A (12x24)	Default is Font B (9x16)
6	Wide paper (78 mm)	Thinner paper (58 mm)
7	Не се използва	
8	Hardware flow control	Xon/Xoff flow control
9	USB interface disabled	USB interface enabled
10	USB is ALWAYS in DEVICE mode	
11	Normal operation mode	Protocol mode
12	Cutter enabled	Cutter disabled
13	Default select printer	Default select customer display

To change the settings:

1. Изключете принтера.
2. Switch **ON** the printer pressing **FEED** button.
POWER – green, ERROR – red, are rotated after every beep.
3. After the **4-th beep** (after about 6 сек.) and 2 short beeps, accompanied by 2 LED blinking – **POWER – green, ERROR – red**. After releasing the **FEED** button in this printer state, the printer enters the hardware setup mode (hardware menu) and prints the current settings.
4. Follow the printer instruction to make the necessary changes.

Long pressing the **FEED** button (**YES**) – confirms changes.

Short pressing the **FEED** button (**No Changes**) – cancels changes.



Care must be taken when changing factory preset

HARDWARE SETTINGS NOT STORED!
STORE SETTINGS?

CHANGED SETTINGS

```

MEMORY SWITCHES: 1111000001000
ENABLE SOUND: YES
EXECUTE <CR> AS <LF>: YES
DISABLE <LF> COMMAND: YES
DISABLE <LF> AFTER <CR>: YES
DEFAULT SMALL FONT: NO
WIDEN PAPER: NO
BLACK MARK MODE: NO
XON/XOFF: NO
ENABLE USB INTERFACE: NO
USB IN DEVICE MODE: YES
PROTOCOL MODE: NO
CUTTER OFF: NO
DEFAULT SELECT DISPLAY: NO

BAUD RATE: 115200 bps
PRINT DARKNESS: 100 %
CHARACTER TABLE: UserApm (1252)
USB DEVICE CLASS: Printer

CHANGE USB DEVICE CLASS?
CHANGE CHARACTER TABLE?
CHANGE PRINT DARKNESS?
CHANGE BAUD RATE?
DEFAULT SELECT DISPLAY ?
CUTTER OFF ?
PROTOCOL MODE ?
USB IN DEVICE MODE ?
ENABLE USB INTERFACE ?
XON/XOFF ?
BLACK MARK MODE ?
WIDEN PAPER ?
DEFAULT SMALL FONT ?
DISABLE <LF> AFTER <CR> ?
DISABLE <LF> COMMAND ?
EXECUTE <CR> AS <LF> ?
ENABLE SOUND ?

CHANGE MEMORY SWITCHES?
RESTORE FACTORY DEFAULTS?

```

READ QUESTIONS CAREFULLY!

CURRENT SETTINGS

```

MEMORY SWITCHES: 1000000111000
ENABLE SOUND: YES
EXECUTE <CR> AS <LF>: NO
DISABLE <LF> COMMAND: NO
DISABLE <LF> AFTER <CR>: NO
DEFAULT SMALL FONT: NO
WIDEN PAPER: YES
BLACK MARK MODE: YES
XON/XOFF: YES
ENABLE USB INTERFACE: YES
USB IN DEVICE MODE: YES
PROTOCOL MODE: NO
CUTTER OFF: NO
DEFAULT SELECT DISPLAY: NO

BAUD RATE: 115200 bps
PRINT DARKNESS: 100 %
CHARACTER TABLE: UserApm (1252)
USB DEVICE CLASS: Printer

Press <FEED> SHORT for "NO"
Hold <FEED> LONG for "YES"
Turn off to cancel!

```

HARDWARE SETUP

WARNING! USING HARDWARE MENU

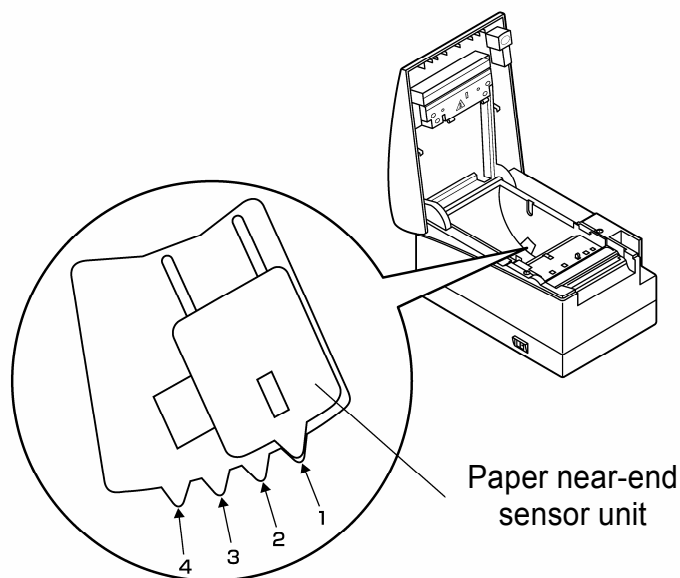
MAY CAUSE UNWANTED SETTINGS!

PRESS <FEED> LONG TO CONTINUE

Adjusting the paper near-end sensor

1. Lightly push in the paper near-end sensor unit
2. Move the paper near-end sensor unit to the right and left while keeping to press it. The sensor position is as shown below depending on the diameter of the roll paper used.

Sensor position	Roll paper diameter at the detection of near-end (mm)	Outer core diameter of roll paper used
1	22	18
2	25	22
3	29	25
4	34	32



Loading Drivers for EP-2000:

To print information from your device it is necessary to install ESC/POS drivers.

Current versions of application programs, drivers and SDK are distributed online and are available for free download at the website, indicated below:

www.datecs.bg

Loading/Replacing the paper roll

EP-2000 uses a roll thermal paper for printing. The width and diameter of the paper roll are specified in the printer's technical specification.

EP-2000 uses a drop-and-load design making paper loading easy and trouble free. To load paper, simply lift up the paper cover latch and drop in the new roll as shown in the steps below.

1. Lift the cover open button
2. Open the printer cover.
3. Insert a new paper roll.

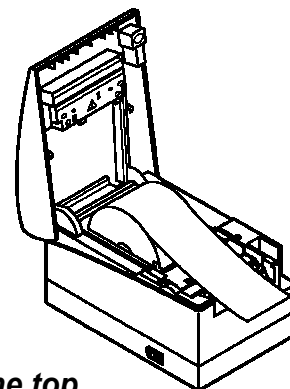


The thermal roll must be placed as shown in the figure on the right – the thermal surface of the media must be faced to the thermal head.

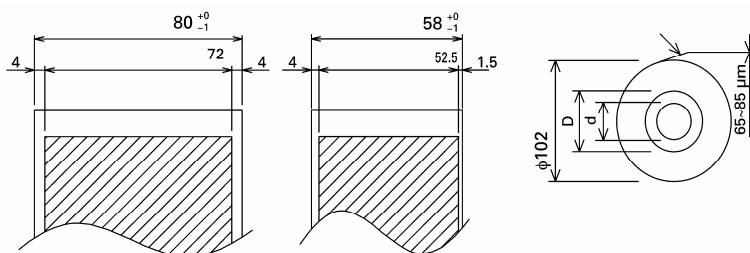
4. Close the printer cover until a click can be heard.



Be sure to pull at least 12 mm or more of media above the top of the printer before closing.



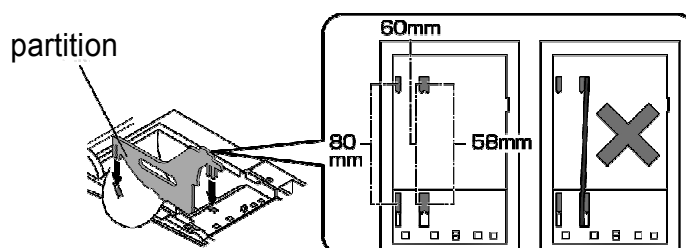
The paper roll recommended parameters



Max. paper width, mm	80/58
Max. print width, mm	72/52.5
Max. paper roll diameter, mm	102
Paper thickness, μm	65-85
Core outer diameter (D), mm	18 (for 65-75μm) / 32 (for 75-85μm)
Core inner diameter (d), mm	12 (for 65-75μm) / 25.4 (for 75-85μm)

Partition for paper roll

Put the partition for 58/60 mm paper roll correctly, as shown in the picture below.



SELF TEST printing

Short SELF TEST

Press and Hold the **LF** button, while Power On the printer. Release – **after ~ 0.5 sec and after the 1-beep**. The printer will print a **Short Self Test**, which contains information about printer configuration.

The **Short SELF TEST** looks as shown below:

```

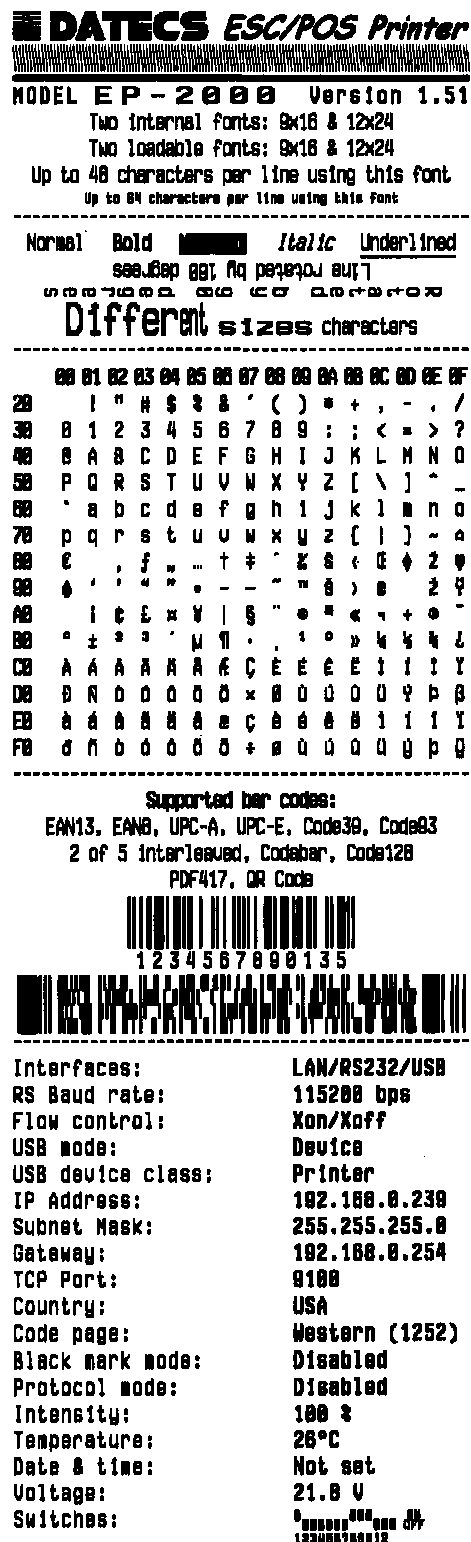
DATECS ESC/POS Printer
=====
MODEL EP - 2000   Version 1.51
Interfaces:       LAN/RS232/USB
RS Baud rate:    115200 bps
Flow control:    Xon/Xoff
USB mode:        Device
USB device class: Printer
IP Address:      192.168.0.239
Subnet Mask:     255.255.255.0
Gateway:         192.168.0.254
TCP Port:        9100
Country:         USA
Code page:       Western (1252)
Black mark mode: Disabled
Protocol mode:   Disabled
Intensity:       100 %
Temperature:     25°C
Date & time:     Not set
Voltage:         21.8 V
Switches:        ■■■■■■ ■■■■ ON
                  123456789012 OFF
  
```

Long SELF TEST

Press and Hold the **LF** button, while Power On the printer. Release – **after ~ 4.5 sec and after the 3-beep**. The printer will print a **Long Self Test**, which contains additional information about:

- Resident font sizes;
- Characters per line;
- Text forming;
- Resident character set;
- Resident barcode symbols;

A **Long SELF TEST** is shown in the image on the right:



Troubleshooting

If you're having printing problem refer to the table below for possible causes:

No	Problem	Possible Causes
1.	Paper feeds after issuing a print job, but no printed text visible on paper.	Thermal media is specially coated on outside of roll. Remove paper roll and reload properly. See section "Loading Paper" for details on loading paper.
		Paper cover not installed properly. See section "Loading Paper" for details on replacing paper cover.
2.	POWER – Green, ERROR – red are rotated	The printer thermal head is overheat. When the printer head temperature returns to normal the POWER flashes green and the printer continues to print.
3.	Printing is light or missing only on half of the print width.	Paper cover not properly installed. See section on loading paper. Mechanism jarred loose. Contact technical support.
4.	ERROR LED is permanently lit red .	End of the paper or paper out; After the loading a new paper roll and pressing FEED button, the POWER LED flashes green and the printer is ready to print.

No	Command	Description
1	BEL	Sounds the buzzer
2	HT	Horizontal Tab Command
3	LF	Printing a line and Paper Feeding command
4	FF	Printing and paper feeding to the black mark position
5	CR	The operation of the command depends on the state of the configuration flags 2, 3 and 4
6	DC2 =	DC3 (Ruled line) commands sequence start
7	DC3 (Sets the ruled line ON
8	DC3 +	Sets the ruled line off
9	DC3 -	Selects ruled line A
10	DC3 A	Selects ruled line B
11	DC3 B	Clears selected ruled line buffer
12	DC3 C	Sets a single dot in selected ruled line buffer
13	DC3 D	Ruled line pattern set
14	DC3 F	Ruled line line set
15	DC3 L	Selects ruled line combine mode
16	DC3 M	Ruled line 1 dot line print
17	DC3 P	Ruled line n dots line print
18	DC3 p	Ruled line image write
19	DC3 v	Canceling print data in page mode
20	CAN	Printing data in page mode
21	ESC FF	DC3 (Ruled line) commands sequence start
22	ESC RS	Sounds the buzzer
23	ESC SP	Setting character spacing
24	ESC #	Setting EURO symbol position
25	ESC \$	Specifying the absolute horizontal position of printing
26	ESC %	Selecting/Canceling the printing of downloaded user character sets
27	ESC &	Selecting user character set
28	ESC !	Specifying printing mode of text data
29	ESC *	Printing graphical data
30	ESC -	Selecting/Canceling underlining
31	ESC .	Printing self test/diagnostic information

Списък на командите в ESC/POS режим

DATECS EP-2000

32	ESC 2	Specifying 1/6-inch line feed rate
33	ESC 3	Specifying line feed rate n/203 inches
34	ESC <	Changes print direction to opposite
35	ESC =	Data input control
36	ESC >	Selecting print direction
37	ESC @	Initializing the printer
38	ESC D	Setting horizontal tab position
39	ESC E	Specifying/Canceling highlighting
40	ESC F	Filling or inverting the page area in page mode
41	ESC G	Specifying/Canceling highlighting
42	ESC I	Specifying/Canceling Italic print
43	ESC J	Printing and Paper feed n/203 inches
44	ESC L	Selecting page mode
45	ESC N	Reading programmed serial number
46	ESC R	Selecting country
47	ESC S	Specifying speed (bps) of the serial port
48	ESC T	Printing short self test
49	ESC U	Selecting/Canceling underlined printing
50	ESC V	Selecting/Canceling printing 90°- right turned characters
51	ESC W	Defining the print area in page mode
52	ESC X	Specifying max printing speed
53	ESC Y	Selecting intensity level
54	ESC Z	Returning diagnostic information
55	ESC \	Specifying relative horizontal position
56	ESC]	Loading the default settings stored in Flash memory
57	ESC ^	Saving current settings in Flash memory
58	ESC _	Loading factory settings
59	ESC `	Reading the Battery Voltage and Thermal head temperature
60	ESC a	Aligning the characters
61	ESC b	Increasing text line height
62	ESC c5	Enabling/Disabling the functioning of the button LF
63	ESC d	Printing and feeding paper by n- lines

64	ESC f	Select symbol '0' printing style
65	ESC i	Feeding paper backwards
66	ESC o	Temporarily feeding paper forward
67	ESC p	Generating a drawer pulse
68	ESC r	Full command for sounding buzzer
69	ESC s	Reading print settings
70	ESC u	Selecting code table
71	ESC v	Transmitting the printer status
72	ESC y LAN	Programming setting LAN
73	ESC {	Enabling/Canceling printing of 180° turned characters
74	GS FF	Printing in page mode and returning to standard mode
75	GS \$	Specifying the absolute vertical position in page mode
76	GS)	Setting printer flags (memory switches)
77	GS *	Defining a Downloaded Bit Image (logo)
78	GS /	Printing a Downloaded Bit Image
79	GS :	Starting/ending macro definitions
80	GS B	Enabling/Disabling inverse printing (white on black)
81	GS C	Read the Real Time Clock
82	GS H	Selecting Printing position of HRI Code
83	GS L	Setting the left margin
84	GS Q	Printing 2-D barcodes
85	GS R	Filling or inverting a rectangle in page mode
86	GS S	Selecting 2-D barcode cell size
87	GS T	Selecting the print direction in page mode
88	GS U	Selecting standard mode
89	GS V	Paper cutting
90	GS W	Setting the print area width
91	GS X	Drawing a rectangular box with selected thickness in page mode
92	GS Z	Printing the non blank page area only in page mode
93	GS \	Specifying the relative vertical position in page mode
94	GS ^	Executing macro
95	GS c	Setting the Real Time Clock
96	GS f	Setting the font of HRI characters of the barcode
97	GS h	Setting the height of the barcode

98	GS k	Printing a barcode
99	GS p	Settings for 2D barcode PDF417
100	GS q	Selecting the height of the module of 2D barcode PDF417
101	GS w	Selecting the horizontal size (Scale factor) of the barcode
102	GS x	Direct text print in page mode

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103	FS !	Specifying printing mode of two-byte text data
104	FS &	Selecting two-byte text mode (JIS or GB2312)
105	FS -	Selecting/Canceling underline mode for two-byte text mode
106	FS .	Canceling two-byte text mode
107	FS 2	Defining one custom Kanji character
108	FS C	Selecting Shift-JIS mode (Japanese version only)
109	FS S	Specifying character spacing for two-byte text mode
110	FS W	Selecting double size characters for two-byte text mode



* For details about commands for ESC/POS mode see Programmer's User.